CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME III

Editors:

Md. Zahangir Alam
Ahmed Tariq Jameel
Azura Amid

IIUM PRESS

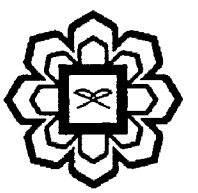
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

(*VOLUME III*)

Editors:
Md. Zahangir Alam
Ahmed Tariq Jameel
Azura Amid

Department of Biotechnology Engineering
Faculty of Engineering
International Islamic University Malaysia



IIUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011

Perpustakaan Negara Malaysia Cataloguing-in-Publication Data

Md. Zahangir Alam, Ahmed Tariq Jameel & Azura Amid: Current Reasearch and Development in Biotechnology Engineering at IIUM Volume III

ISBN: 978-967-418-144-4

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM
(Malaysian Scholarly Publishing Council)

Printed by :
IIUM PRINTING SDN. BHD.
No. 1, Jalan Industri Batu Caves 1/3
Taman Perindustrian Batu Caves
Batu Caves Centre Point
68100 Batu Caves
Selangor Darul Ehsan

CONTENTS

CHAPTER 8

BATCH FERMENTATION OF RECOMBINANT *ESCHERICHIA COLI* PRODUCING B-GLUCURONIDASE USING DIFFERENT CONTROL CONDITION

Mohd Ismail Abdul Karım, Hamzah Mohd Salleh and Maızirwan Mel

Department of Biotechnology Engineerıng, Faculty of Engıneering, Internatıonal Islamıc Universıty Malaysia, P.O. Box 10, 50728 Kuala Lumpur, Malaysia

ABSTRACT

Experiments were carried out in batch process in bioreactor to study the growth kinetics of *E coli* at different control condition. The process condition has been designed using Taguchi's method with three factors and two levels. From four experiment, Run 1 which has the condition of pO_2=40%, airflow rate=0.5 vvm and pH=7.2 produce the highest product yield, $Y_{P/S}$ of 1.03 (g/g) and the smallest specific growth rate, μ of 0.0072 h^{-1}.

Keywords: recombinant *E. coli*, fermentation, β-glucuronidase, enzyme

INTRODUCTION

β-glucuronidase, the enzyme responsible for the degradation of various polysaccharides or the cleavage of glucurono-conjugates, is widely distributed in animal, plants, insects and bacteria, with particularly high concentrations in liver found in animals. It catalyzes the hydrolysis of *β*-glucuronidase conjugates to yield aglycone and free glucuronic acid.

E. coli is classified as nonphotosynthetic and mesophiles bacteria (Wang and Touster, 1972). There are hundreds of different types of *E. coli* recognized by the combination of sugars and proteins displayed on the bacterial surface (Christner et al., 1970). *E coli* bacteria have long rods without separation when grown under limiting conditions.

There are several advantages of using recombinant *E. coli* for protein synthesis. It is one of the most-studied organisms used for recombinant protein synthesis (Himeno et al., 1974) and its genetics and physiology are far better understood than any other living organism, which greatly facilitates genetic manipulations (Richins et al., 1997). *E. coli* also does not require any growth factors: they can synthesize all essential purines,